

## What is Claimed:

1                   1.       Apparatus for processing a first video signal having successive video  
2 images to produce a second video signal having respective successive video images:

3                   a formatter coupled to receive a first video signal and configured to divide  
4 each video image into a plurality of parts each part including an active video portion and a  
5 vertical blanking portion;

6                   a plurality of processors coupled to receive respectively different ones of the  
7 parts of the video images from said formatter, to begin processing the received parts as soon  
8 as the entire part has been received and to provide respective processed parts with a  
9 predetermined delay; and

10                  a demultiplexer coupled to the plurality of converters for combining the  
11 processed parts to provide the second video signal, wherein the second video signal is  
12 delayed with respect to the first video signal by an interval substantially equal to the  
13 predetermined delay plus an amount of time represented by the active video portion of one of  
14 the plurality of parts.

1                   2.       Apparatus for converting a first video signal having successive video  
2 images in a first format to a second video signal in a second format comprising:

3                   a formatter coupled to receive a first video signal and configured to divide  
4 each video image into a plurality of parts;

5                   a plurality of format converters coupled to receive respectively different ones  
6 of the parts of the video images from said formatter and to provide respective converted parts  
7 of video images in the second format; and

8                   a demultiplexer coupled to the plurality of format converters for combining the  
9 converted parts to provide the second video signal.

1                   3.       Apparatus in accordance with claim 2 wherein the plurality of parts is  
2 two parts and each said two parts comprises a vertical blanking portion, an active video

portion and an overlap portion which includes video signal information that is also in the other one of the two parts.

4. Apparatus in accordance with claim 3 wherein each of the format converters includes a vertical filter having a predetermined kernel size and the amount of video information in the overlap portion is determined by the kernel size of the vertical filter.

5. Apparatus in accordance with claim 2 further including a controller that controls each of said plurality of converters to process the respective part of the image of the first video signal independently of the processing of any other part of the first image of the first video signal.

6. Apparatus in accordance with claim 5 wherein the controller adjusts a start phase of said each of the plurality of converters except for the first converter to match an end phase of a previous one of said plurality of converters.

7. Apparatus in accordance with claim 2 wherein the formatter loads each of said plurality of converters in sequence with a respective one of the parts of each video image.

8. A circuit for reducing the delay of converting video signal in a first format defined as a sequence of interlaced video fields to a video signal in a second format comprising:

an input formatter connected to receive the video signal in the first format for dividing each active video field thereof into an active video top half field and an active video bottom half field;

a first format converter coupled to receive the active video top half field for converting the active video top half field into the second format;

a second format converter coupled to receive the active video bottom half field for converting the active video bottom half field into the second format; and

11 a demultiplexer connected to the first format converter and the second format  
12 converter for combining the active video top half field in the second format with the active  
13 video bottom half field in the second format to produce the video signal in the second format,  
14 delayed by approximately three-quarters of one frame interval relative to the first video  
15 signal.

1 9. A method for processing a first video signal having successive video  
2 images to produce a second video signal having respective successive video images,  
3 including the steps of:

4 dividing each video image into a plurality of parts each part including an  
5 active video portion and a vertical blanking portion;

6 processing each of the parts of at least one of the video images as soon as the  
7 entire part has been received to provide respective processed parts with a predetermined  
8 delay relative to when the respective part was received; and

9 combining the processed parts to provide the second video signal, wherein the  
10 second video signal is delayed with respect to the first video signal by an interval  
11 substantially equal to the predetermined delay plus an amount of time represented by the  
12 active video portion of one of the plurality of parts.

1 10. A method in accordance with claim 9, wherein the step of processing  
2 each of the parts of at least one of the video images includes concurrently processing a  
3 predetermined number of lines of the part, whereby the step of processing defines a  
4 predetermined number of phases, wherein the step of processing further includes the step of  
5 adjusting the processing phase of each part except a first part to match an ending processing  
6 phase of a previous part.

1 11. A method for converting a video signal from a first format defined as a  
2 sequence of interlaced video fields to a video signal in a second format with a reduced delay  
3 comprising the steps of:

4                   dividing each active video field into two portions to sequentially provide an  
5 active video top half field and an active video bottom half field;

6                   converting the active video top half field into the second format as soon as the  
7 video top-half field is provided to provide a converted video top half field;

8                   converting the active video bottom half field into the second format as soon as  
9 the video bottom half field is provided to provide a converted video bottom half field; and

10                  combining the converted video top half field with the converted video bottom  
11 half field to produce a field of the video signal in the second format delayed by  
12 approximately three-quarters of one frame interval relative to the first video signal.

1                   12.     A method in accordance with claim 10, wherein the steps of converting  
2 the active video top half field and of converting the active video bottom half field each  
3 includes concurrently processing a predetermined number of lines of the respective top half  
4 field and bottom half field, whereby the step of converting defines a predetermined number  
5 of phases, wherein the step of converting the active video bottom half field further includes  
6 the step of adjusting the phase with which the bottom half field is converted to match an  
7 ending processing phase of the top half field.

1                   13.     A computer readable carrier including computer program instructions  
2 that cause a computer to perform a method for converting a video signal from a first format  
3 defined as a sequence of interlaced video fields to a video signal in a second format with a  
4 reduced delay comprising the steps of:

5                   dividing each active video field into two portions to sequentially provide an  
6 active video top half field and an active video bottom half field;

7                   converting the active video top half field into the second format as soon as the  
8 video top-half field is provided to provide a converted video top half field;

9                   converting the active video bottom half field into the second format as soon as  
10 the video bottom half field is provided to provide a converted video bottom half field; and

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11 combining the converted video top half field with the converted video bottom  
12 half field to produce a field of the video signal in the second format delayed by  
13 approximately three-quarters of one frame interval relative to the first video signal.

1 14. A computer readable carrier in accordance with claim 13, wherein the  
2 computer program instructions that cause the computer to perform the steps of converting the  
3 active video top half field and of converting the active video bottom half field includes  
4 computer program instructions that cause the computer to concurrently process a  
5 predetermined number of lines of the respective top half field and bottom half field, whereby  
6 the step of converting defines a predetermined number of phases, wherein the computer  
7 program instructions that cause the computer to perform the step of converting the active  
8 video bottom half field further include computer program instructions that cause the  
9 computer to adjust the phase with which the bottom half field is converted to match an  
10 ending processing phase of the top-half field.